

Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A fuel reforming apparatus for generating hydrogen by reforming reaction, comprising:

a premixed fuel storing portion which includes mixture state stabilizing means for maintaining a state in which reformed fuel and water that are to be supplied for the reforming reaction are mixed evenly, and stores the reformed fuel and the water as premixed fuel formed by mixing the reformed fuel and the water substantially evenly by the mixture state stabilizing means;

a reformer which includes a reforming catalyst for promoting the reforming reaction; and

a premixed fuel supplying portion which supplies the reformer with the premixed fuel stored in the premixed fuel storing portion; and

an independent material supplying portion which supplies the reformer with independent material that contains water generated in a system including the fuel reforming apparatus, independently of the premixed fuel supplying portion.

2. (Original) The fuel reforming apparatus according to claim 1, wherein the reformed fuel is hydrophobic liquid hydrocarbon.

3. (Original) The fuel reforming apparatus according to claim 1, wherein the mixture state stabilizing means is provided with an emulsifier which is mixed in the premixed fuel, and which makes the reformed fuel and the water stable emulsion.

4. (Original) The fuel reforming apparatus according to claim 1, wherein the mixture state stabilizing means includes an agitating portion for agitating the reformed fuel and the water physically.

5. (Original) The fuel reforming apparatus according to claim 1, wherein the premixed fuel supplying portion includes:

a vaporizing portion which is a predetermined space communicating with the reformer;

a heating portion which supplies the vaporizing portion with heat for enabling the premixed fuel to be vaporized; and

a spraying portion which sprays the premixed fuel stored in the premixed fuel storing portion into the vaporizing portion.

6. (Currently Amended) The fuel reforming apparatus according to claim 5, wherein:

the premixed fuel supplying portion includes a premixed fuel temperature increasing portion which increases a temperature of the premixed fuel using heat of the gas containing hydrogen, generated by the reforming reaction before spraying the premixed fuel into the vaporizing portion, and

a heat exchanger which performs a heat exchanging between the gas containing hydrogen generated by the reforming reaction and the premixed fuel is disposed between the premixed fuel storing portion and the vaporizing portion.

7-8. (Cancelled)

9. (Currently Amended) The fuel reforming apparatus according to ~~claim 8~~claim 1, wherein the independent material supplying portion includes:

a gas supplying portion which supplies the reformer with gas containing oxygen; and

a humidifying portion which adds the water generated in the system in a form of steam to the gas containing oxygen, that is to be supplied by the gas supplying portion to the reformer.

10. (Original) The fuel reforming apparatus according to claim 9, wherein the humidifying portion includes:

a first passage through which the gas containing oxygen flows;
a second passage through which the water generated in the system flows in a form of steam; and

a hydrogen permeable membrane which is provided between the first passage and the second passage, and through which steam permeates from a side in which steam partial pressure high to a side in which steam partial pressure is low.

11. (Original) The fuel reforming apparatus according to claim 1, wherein the premixed fuel storing portion makes a ratio of the number of molecules of the water in the premixed fuel with respect to the number of carbon atoms in the reformed fuel at least 0.5.

12. (Original) The fuel reforming apparatus according to claim 1, wherein the premixed fuel storing portion makes a ratio of the number of molecules of the water in the premixed fuel with respect to the number of carbon atoms in the reformed fuel at most 1.0.

13. (Currently Amended) The fuel reforming apparatus according to claim 1, wherein:

the premixed fuel supplying portion includes:

a premixed fuel temperature increasing portion which increases a temperature of the premixed fuel stored in the premixed fuel storing portion using heat of gas containing the hydrogen generated by the reforming reaction; and

a vaporizing portion which vaporizes the premixed fuel whose temperature has been increased in the premixed fuel temperature increasing portion before supplying the premixed fuel to the reformer, and

a heat exchanger which performs a heat exchanging between the gas containing hydrogen generated by the reforming reaction and the premixed fuel is disposed between the premixed fuel storing portion and the vaporizing portion.

14. (Currently Amended) A fuel cell system, comprising:

the fuel reforming apparatus according to claim 1; and

a fuel cell which generates an electromotive force by an electrochemical reaction using hydrogen generated in the fuel reforming apparatus.

15. (Currently Amended) A fuel cell system, comprising:

the fuel reforming apparatus according to ~~claim 8~~claim 1; and

a fuel cell which generates an electromotive force by an electrochemical reaction using hydrogen generated in the fuel reforming apparatus,

wherein the water supplied from the independent material supplying portion contains water generated in the fuel cell.

16. (Original) The fuel cell system according to claim 15, wherein the water supplied from the independent material supplying portion contains water in exhaust gas emitted from an anode side of the fuel cell.

17. (Original) The fuel cell system according to claim 15, wherein the water supplied from the independent material supplying portion contains water in exhaust gas emitted from a cathode side of the fuel cell.

18. (Original) The fuel cell system according to claim 15, further comprising:

a first combustion portion which burns hydrogen that remains in exhaust gas emitted from an anode of the fuel cell, wherein the water supplied from the independent material supplying portion contains water generated in the first combustion portion.

19. (Original) The fuel cell system according to claim 15, further comprising:

a hydrogen separating portion which includes a hydrogen permeable membrane that selectively makes hydrogen permeate therethrough, and which separates hydrogen in gas emitted from the fuel reforming apparatus using the hydrogen permeable membrane;

a hydrogen supplying portion which supplies the fuel cell with the hydrogen separated in the hydrogen separating portion; and

a second combustion portion which burns gas that remains after separation of hydrogen in the hydrogen separating portion, wherein the water supplied from the independent material supplying portion contains water generated in the second combustion portion.

20. (Currently Amended) A fuel cell system, comprising:

the fuel reforming apparatus according to claim 6; and

athe fuel cell which generates an electromotive force by an electrochemical reaction, wherein:

the fuel reforming apparatus includes a hydrogen extracting portion having a hydrogen permeable membrane which selectively makes hydrogen permeate therethoughtherethrough, and extracts hydrogen from gas containing hydrogen using the hydrogen permeable membrane by being supplied with the gas containing hydrogen generated in the reformer, and operates at a temperature that is higher than that of the fuel cell, and

the premixed fuel temperature increasing portion increases a temperature of the premixed fuel using the hydrogen extracted by the hydrogen extracting portion, and supplies the hydrogen used for increasing the temperature of the premixed fuel for the electrochemical reaction in the fuel cell, and

the hydrogen extracting portion which operates at a temperature that is higher than a temperature of the fuel cell is located between the reformer and the heat exchanger.

21. (Currently Amended) The fuel reforming apparatus according to claim 13; and

athe fuel cell which generates an electromotive force by an electrochemical reaction, wherein:

the fuel reforming apparatus includes a hydrogen extracting portion having a hydrogen permeable membrane which selectively makes hydrogen permeate therethoughtherethrough, and extracts hydrogen from gas containing hydrogen using the

hydrogen permeable membrane by being supplied with the gas containing hydrogen generated in the reformer, and operates at a temperature that is higher than that of the fuel cell, and

the premixed fuel temperature increasing portion increases a temperature of the premixed fuel using the hydrogen extracted by the hydrogen extracting portion, and supplies the hydrogen used for increasing the temperature of the premixed fuel for the electrochemical reaction in the fuel cell, and

the hydrogen extracting portion which operates at a temperature that is higher than a temperature of the fuel cell is located between the reformer and the heat exchanger.

22. (Currently Amended) A fuel reforming apparatus for generating hydrogen by reforming reaction, comprising:

a premixed fuel storing portion which includes an additive agent maintaining a state in which reformed fuel and water that are to be supplied for the reforming reaction are mixed evenly, and stores the reformed fuel and the water as premixed fuel formed by mixing the reformed fuel and the water substantially evenly by the additive agent;

a reformer which includes a reforming catalyst for promoting the reforming reaction; and

a premixed fuel supplying portion which supplies the reformer with the premixed fuel stored in the premixed fuel storing portion; and

an independent material supplying portion which supplies the reformer with independent material that contains water generated in a system including the fuel reforming apparatus, independently of the premixed fuel supplying portion.

23. (Original) The fuel reforming apparatus according to claim 22, wherein the reformed fuel is hydrophobic liquid hydrocarbon.

24. (Original) The fuel reforming apparatus according to claim 22, wherein the additive agent is an emulsifier which is mixed in the premixed fuel, and which makes the reformed fuel and the water stable emulsion.

25. (Original) The fuel reforming apparatus according to claim 22, wherein the premixed fuel supplying portion includes:

a vaporizing portion which is a predetermined space communicating with the reformer;

a heating portion which supplies the vaporizing portion with heat for enabling the premixed fuel to be vaporized; and

a spraying portion which sprays the premixed fuel stored in the premixed fuel storing portion into the vaporizing portion.

26. (Currently Amended) The fuel reforming apparatus according to claim 25, wherein:

the premixed fuel supplying portion includes a premixed fuel temperature increasing portion which increases a temperature of the premixed fuel using heat of the gas containing hydrogen, generated by the reforming reaction before spraying the premixed fuel into the vaporizing portion, and

a heat exchanger which performs a heat exchanging between the gas containing hydrogen generated by the reforming reaction and the premixed fuel is disposed between the premixed fuel storing portion and the vaporizing portion.

27-28. (Cancelled)

29. (Currently Amended) The fuel reforming apparatus according to ~~claim 28~~claim 22, wherein the independent material supplying portion includes:

a gas supplying portion which supplies the reformer with gas containing oxygen; and

a humidifying portion which adds the water generated in the system in a form of steam to the gas containing oxygen, that is to be supplied by the gas supplying portion to the reformer.

30. (Original) The fuel reforming apparatus according to claim 29, wherein the humidifying portion includes:

a first passage through which the gas containing oxygen flows;

a second passage through which the water generated in the system flows in a form of steam; and

a hydrogen permeable membrane which is provided between the first passage and the second passage, and through which steam permeates from a side in which steam partial pressure high to a side in which steam partial pressure is low.

31. (Original) The fuel reforming apparatus according to claim 22, wherein the premixed fuel storing portion makes a ratio of the number of molecules of the water in the premixed fuel with respect to the number of carbon atoms in the reformed fuel at least 0.5.

32. (Original) The fuel reforming apparatus according to claim 22, wherein the premixed fuel storing portion makes a ratio of the number of molecules of the water in the premixed fuel with respect to the number of carbon atoms in the reformed fuel at most 1.0.

33. (Currently Amended) The fuel reforming apparatus according to claim 22, wherein:

the premixed fuel supplying portion includes:
—a premixed fuel temperature increasing portion which increases a temperature of the premixed fuel stored in the premixed fuel storing portion using heat of gas containing the hydrogen generated by the reforming reaction; and
—a vaporizing portion which vaporizes the premixed fuel whose temperature has been increased in the premixed fuel temperature increasing portion before supplying the premixed fuel to the reformer, and
a heat exchanger which performs a heat exchanging between the gas containing hydrogen generated by the reforming reaction and the premixed fuel is disposed between the premixed fuel storing portion and the vaporizing portion.

34. (Currently Amended) A fuel cell system, comprising:

the fuel reforming apparatus according to claim 22; and
a fuel cell which generates an electromotive force by an electrochemical reaction using hydrogen generated in the fuel reforming apparatus.

35. (Currently Amended) A fuel cell system, comprising:

the fuel reforming apparatus according to ~~claim 28~~claim 22; and
a fuel cell which generates an electromotive force by an electrochemical reaction using hydrogen generated in the fuel reforming apparatus,
wherein the water supplied from the independent material supplying portion contains water generated in the fuel cell.

36. (Original) The fuel cell system according to claim 35, wherein the water supplied from the independent material supplying portion contains water in exhaust gas emitted from an anode side of the fuel cell.

37. (Original) The fuel cell system according to claim 35, wherein the water supplied from the independent material supplying portion contains water in exhaust gas emitted from a cathode side of the fuel cell.

38. (Original) The fuel cell system according to claim 35, further comprising:

a first combustion portion which burns hydrogen that remains in exhaust gas emitted from an anode of the fuel cell, wherein the water supplied from the independent material supplying portion contains water generated in the first combustion portion.

39. (Original) The fuel cell system according to claim 35, further comprising:

a hydrogen separating portion which includes a hydrogen permeable membrane that selectively makes hydrogen permeate therethrough, and which separates hydrogen in gas emitted from the fuel reforming apparatus using the hydrogen permeable membrane;

a hydrogen supplying portion which supplies the fuel cell with the hydrogen separated in the hydrogen separating portion; and

a second combustion portion which burns gas that remains after separation of hydrogen in the hydrogen separating portion, wherein the water supplied from the independent material supplying portion contains water generated in the second combustion portion.

40. (Currently Amended) A fuel cell system, comprising:

the fuel reforming apparatus according to claim 26; and

the fuel cell which generates an electromotive force by an electrochemical reaction, wherein:

the fuel reforming apparatus includes a hydrogen extracting portion having a hydrogen permeable membrane which selectively makes hydrogen permeate therethoughtherethrough, and extracts hydrogen from gas containing hydrogen using the hydrogen permeable membrane by being supplied with the gas containing hydrogen generated in the reformer, and operates at a temperature that is higher than that of the fuel cell, and

the premixed fuel temperature increasing portion increases a temperature of the premixed fuel using the hydrogen extracted by the hydrogen extracting portion, and supplies the hydrogen used for increasing the temperature of the premixed fuel for the electrochemical reaction in the fuel cell, and

the hydrogen extracting portion which operates at a temperature that is higher than a temperature of the fuel cell is located between the reformer and the heat exchanger.

41. (Currently Amended) A fuel cell system, comprising:

the fuel reforming apparatus according to claim 33; and

the fuel cell which generates an electromotive force by an electrochemical reaction, wherein:

the fuel reforming apparatus includes a hydrogen extracting portion having a hydrogen permeable membrane which selectively makes hydrogen permeate therethoughtherethrough, and extracts hydrogen from gas containing hydrogen using the

hydrogen permeable membrane by being supplied with the gas containing hydrogen generated in the reformer, and operates at a temperature that is higher than that of the fuel cell, and

the premixed fuel temperature increasing portion increases a temperature of the premixed fuel using the hydrogen extracted by the hydrogen extracting portion, and supplies the hydrogen used for increasing the temperature of the premixed fuel for the electrochemical reaction in the fuel cell, and

the hydrogen extracting portion which operates at a temperature that is higher than a temperature of the fuel cell is located between the reformer and the heat exchanger.